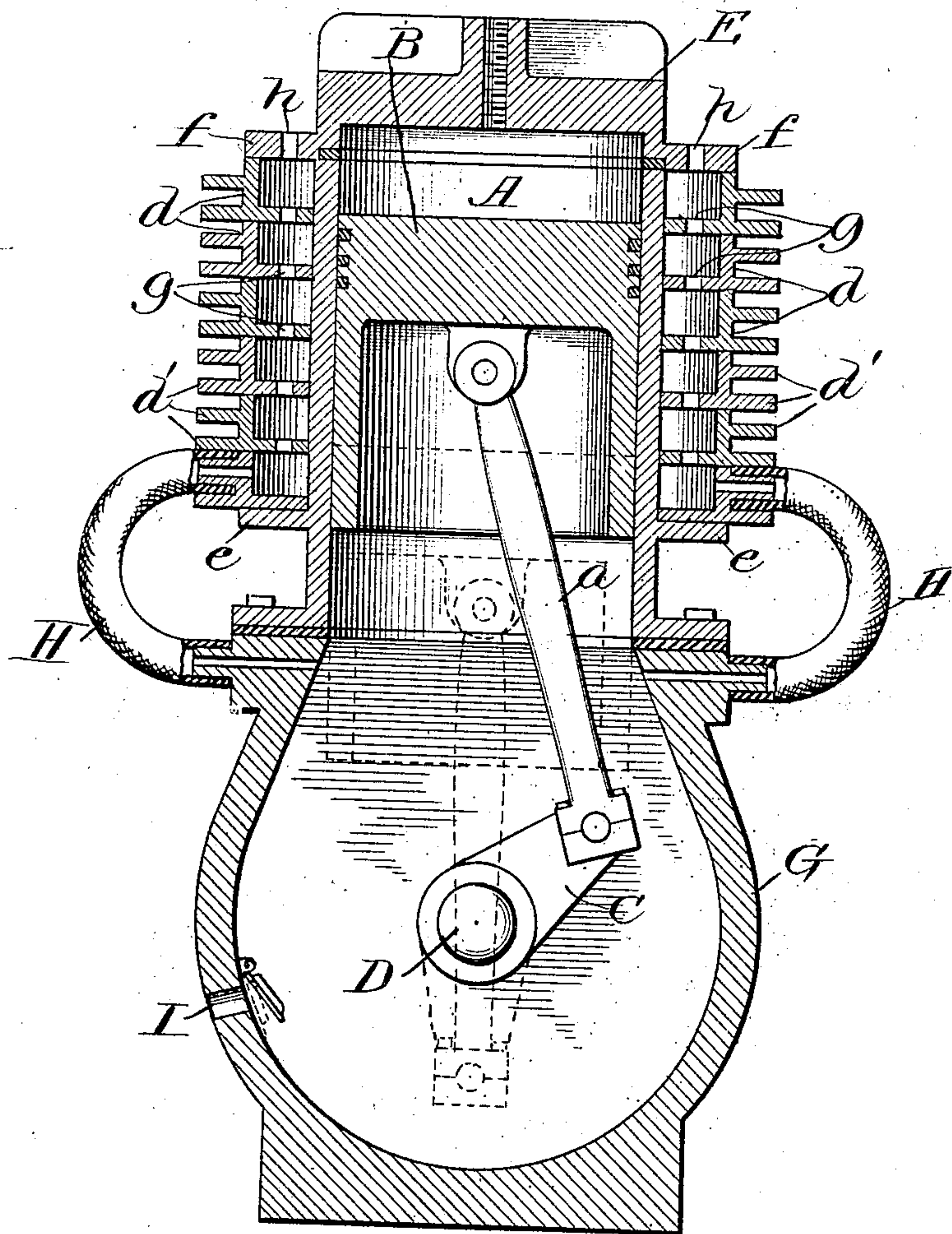


No. 859,205.

PATENTED JULY 9, 1907.

F. DANIELSON & O. CRONWELL.  
AIR JACKET FOR CYLINDERS OF ENGINES.

APPLICATION FILED OCT. 27, 1904.



Witnesses:  
O. M. Newell  
E. K. Lundy

Inventor  
Otto Cronwell  
Frank Danielson.  
by Frank D. Thompson  
Attys



# UNITED STATES PATENT OFFICE.

FRANK DANIELSON AND OTTO CRONWELL, OF CHICAGO, ILLINOIS.

## AIR-JACKET FOR CYLINDERS OF ENGINES.

No. 859,205.

Specification of Letters Patent.

Patented July 9, 1907.

Application filed October 27, 1904. Serial No. 230,213.

To all whom it may concern:

Be it known that we, FRANK DANIELSON and OTTO CRONWELL, both citizens of the United States, and residents of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Air-Jackets for the Cylinders of Engines, of which the following is a full, clear, and exact description.

Our invention relates more particularly to gas-engines, although it could be used in conjunction with other engines and its object is to provide an economical, convenient, and effective means for keeping the cylinders thereof cool by the circulation of air around them. This we accomplish by the means hereinafter fully described, and as particularly pointed out in the claims.

The drawings represent a vertical central section through the cylinder and parts of a gas engine co-operating therewith showing our improvements applied thereto.

In the drawings, A represents the cylinder of a gas engine of the usual construction and B represents the piston reciprocating therein, which, through the medium of a pitman *a* operates the crank C, and, through the latter actuates and revolves the horizontal shaft D. The general construction and operation of all of these parts are the same as in any ordinary gas-engine, and during the operation thereof the cylinder, unless kept cool, becomes very hot. Our improvements for ridding the cylinder of this heat comprise an air jacket which consists of a series of corresponding circular rings *d*, *d*, *d*, *d*, which are preferably made of angular shaped metal and are of such dimensions that they snugly fit over the cylinder A, one above the other, with the inner edges of their intumed flanges in contact with the sides of the cylinder, and their vertical portions bounded by the same vertical plane, and forming a tight compact wall from top to bottom. The lowermost ring *d* of the series is, preferably, supported upon a circumferential flange *e* projecting from cylinder A, near its lower end, and there are a number, say five, of these rings, each supporting the one above it, between the flange *e*, and the projecting flanged circumferential edge *f* of the head E, closing the upper end of the cylinder. Flange *f* of head E closes the space between the side of the cylinder and the top edge of the vertical portion of the uppermost ring *d*, and thus completes a series of annular air chambers surrounding the cylinder between flange *e* and the top of the cylinder. These annular air chambers are constructed independent of each other if desired, and, in this event the circumambient air in these chambers constitutes a cooling-jacket, which contributes to keep the outer circumferential sides of the air jacket comparatively cool because of the circulation of air as will be here-

inafter more fully described, while the heat of the cylinder is carried by their horizontal portions to the outer circumference of the jacket and there dissipated. In order to accomplish this result, however, it is desirable to make the rings of some metal which is a better conductor of heat than the cast iron or steel of which the cylinder is made, and for this reason we prefer to make said rings of tempered copper or a similar metal. For the purpose of increasing the cooling surface of the outer circumference of these rings *d* they are each provided with a suitable number of circumferential flanges *d'*, *d'* that project outward at right angles to the vertical portions of said rings.

In order to obtain better results than could be accomplished by the use of independent air chambers, however, we provide the intumed flanges of rings *d* with a series of holes *g*, *g*, and likewise provide the flange *f* of head E with holes *h*, and then pump air into the lowermost annular air chamber and thus keep a continual current of air passing through the said series of chambers from bottom to top. If desired an air pump may be employed for this purpose which will be entirely independent of the engine. We prefer, however, to inclose the crank C and pitman *a* of the engine in an air-tight case G which supports and is open to the lower end of cylinder A and to connect the interior of the chamber thus formed with the lowermost annular chamber surrounding the cylinder A by pipes H, H. Thus constructed during the downward movement of the piston the air will be forced out of the crank chamber to and out of the annular air chambers surrounding the cylinder, and during the up-stroke of the piston the air will be drawn into said crank chamber. If said crank chamber has no air inlet the air will simply be inhaled and exhaled from the annular chambers of the air-jacket; if however, it has a valve controlled inlet, such as shown at I in the drawings, the air will be drawn into the crank chamber during the up-stroke, and forced out of said annular chambers during the down-stroke of the piston.

What we claim as new is:—

1. In an engine, an air-jacket consisting of a plurality of angular-shaped rings, the vertical portions of which form the outer wall of said jacket and are provided with a series of outwardly projecting circumferential flanges, the inner portions of said rings at right angles to the vertical portions thereof forming partitions that divide the interior of said jacket into a like number of compartments, and a series of openings in said partitions which provide the circulation of air through said compartments.
2. In an engine, an air-jacket consisting of a plurality of rings, the vertical portions of which form the outer wall of said jacket and are provided with a series of outwardly projecting circumferential flanges, the inner portions of said rings at right angles to the vertical portions thereof forming partitions that divide the interior of said jacket into a like number of compartments, a series of openings in said partitions which provide the circulation



of air through said compartments, and means for forcing the air from the crank-chamber to and through said compartments.

5 3. In an engine, an air-jacket comprising a series of rings surrounding the cylinder, each provided with an inturned flange having a plurality of openings therein and a series of circumferential flanges projecting from the outer circumference of said rings, said rings communicating with each other and providing chambers for the circulation of air.

10 4. In an engine, an air-jacket comprising a series of rings surrounding the cylinder, each provided with an inturned flange having a plurality of openings therein and a

series of circumferential flanges projecting from the outer circumference of said rings, said rings communicating 15 with each other and providing chambers for the circulation of air, and means for forcing the air from the crank-chamber to and through said chambers.

In testimony whereof we have hereunto set our hands this 5th day of February, 1903.

FRANK DANIELSON.  
OTTO CRONWELL.

Witnesses:

FRANK D. THOMASON,  
E. K. LUNDY.